Amendments to the Claims

Claim 1 **(Currently Amended)** A method for transmitting an OFDM signal from a transmission side to a reception side, wherein

the OFDM signal comprises at least one data symbol having only a plurality of subcarriers having data therein, and at least one pilot symbol including a plurality of subcarriers, at least one of the subcarriers having a frequency component predetermined in amplitude and phase, said method comprising:

inserting, on the transmission side, the pilot symbol before or after one or more data symbols, and transmitting the pilot symbol together with one or more data symbols; and

utilizing, on the reception side, the received pilot symbol for compensating for a frequency response variation of a transmission path resulted from at least one of distortion in the transmission path, out-of-synchronization with passage of time, frequency drift, and residual phase error, wherein

the frequency response variation of the transmission path is compensated for by using a compensation vector calculated, as a time series linear approximation, from a difference in frequency response between any two pilot symbols closest to each other.

Claim 2 **(Previously Presented)** The OFDM signal transmission method according to claim 1, wherein every subcarrier included in the pilot symbol is a pilot carrier predetermined in amplitude and phase.

Claim 3 **(Previously Presented)** The OFDM signal transmission method according to claim 1, wherein said inserting comprises sequentially inserting the pilot symbol and at least one additional pilot symbol before or after one or more data symbols.

Claim 4 **(Previously Presented)** The OFDM signal transmission method according to claim 1, wherein said inserting comprises periodically inserting a pilot symbol before or after one or more data symbols.

Claim 5 **(Previously Presented)** The OFDM signal transmission method according to claim 1, wherein said inserting comprises non-periodically inserting a pilot symbol before or after one or more data symbols.

Claim 6 **(Previously Presented)** The OFDM signal transmission method according to claim 1, further comprising adaptively changing, on the transmission side, a pilot symbol in frequency and number for insertion depending on a state of the transmission path.

Claim 7 **(Previously Presented)** The OFDM signal transmission method according to claim 1, further comprising providing, on the transmission side, the OFDM signal with control information indicating how often and how many pilot symbols are inserted.

Claims 8 and 9 **(Canceled)**

Claim 10 **(Previously Presented)** The OFDM signal transmission method according to claim 1, wherein the frequency response variation of the transmission path is compensated for by using an average value taken for a phase error among pilot carriers in the pilot symbol.

Claim 11 **(Previously Presented)** The OFDM signal transmission method according to claim 10, wherein the average value is calculated by weighing each amplitude value for the pilot carriers.

Claim 12 **(Currently Amended)** An OFDM signal transmitter for transmitting an OFDM signal towards a reception side, said OFDM signal transmitter comprising:

a data symbol generator for generating an OFDM data symbol including a plurality of subcarriers for data for transmission;

a pilot symbol generator for generating an OFDM pilot symbol including a plurality of subcarriers; and

a symbol selector for switching between signals provided by said data symbol generator and said pilot symbol generator so that the pilot symbol is inserted before or after one or more data symbols, wherein

the OFDM signal comprises at least one data symbol having only a plurality of subcarriers having data therein, and at least one pilot symbol including a plurality of subcarriers, at least one of the subcarriers having a frequency component predetermined in amplitude and phase,

on the reception side, the pilot symbol is received and utilized for compensating for a frequency response variation of a transmission path resulted from at least one of distortion in the transmission path, out-of-synchronization with passage of time, frequency drift, and residual phase error, and

the frequency response variation of the transmission path is compensated for by using a compensation vector calculated, as a time series linear approximation, from a difference in frequency response between any two pilot symbols closest to each other.

Claim 13 **(Previously Presented)** The OFDM signal transmitter according to claim 12, wherein said data symbol generator comprises:

a frequency-domain data symbol generator for generating a frequency-domain data symbol after inputting the data for transmission; and

an inverse Fourier transformer for subjecting a signal provided by said frequency-domain data symbol generator to inverse Fourier transform, and said pilot symbol generator comprises:

a frequency-domain pilot symbol generator for generating a frequency-domain pilot symbol; and

an inverse Fourier transformer for subjecting a signal provided by said frequency-domain pilot symbol generator to inverse Fourier transform.

Claim 14 **(Currently Amended)** An OFDM signal receiver for receiving, from a transmission side, an OFDM signal comprising at least one data symbol having only a plurality of subcarriers having data therein, and at least one pilot symbol including a plurality of subcarriers, at least one of the subcarriers having a frequency component predetermined in amplitude and phase, and being inserted before or after one or more data symbols, said OFDM signal receiver comprising:

a Fourier transformer for subjecting the received OFDM signal to Fourier transform;

a transmission path frequency response compensator for detecting the pilot symbol from a signal provided by said Fourier transformer, and, with respect to the signal, compensating for a frequency response variation of a transmission path; and a demodulator for receiving the signal compensated for the frequency response variation of the transmission path, and demodulating the signal to output demodulated data, wherein

said transmission path frequency response compensator compensates for the frequency response variation of the transmission path by using a compensation vector calculated, as a time series linear approximation, from a difference in frequency response between any two pilot symbols closest to each other.

Claim 15 **(Previously Presented)** The OFDM signal receiver according to claim 14, wherein said transmission path frequency response compensator calculates a compensation vector for compensation, by referring to a frequency response of a pilot symbol, for a frequency response of another pilot symbol closest thereto, and a frequency response of a reference pilot symbol provided on a reception side, so that a frequency response of the received data symbol corresponds to that of the reference pilot symbol.

Claim 16 **(Previously Presented)** The OFDM signal receiver according to claim 15, wherein said transmission path frequency response compensator calculates a compensation vector for every subcarrier included in the received data symbol by using every pilot carrier included in each of the pilot symbols.

Claim 17 **(Previously Presented)** The OFDM signal receiver according to claim 15, wherein said transmission path frequency response compensator calculates the compensation vector as a time series linear approximation from the frequency response variation between any two pilot symbols closest to each other.

Claim 18 **(Previously Presented)** An OFDM signal receiver for receiving, from a transmission side, an OFDM signal comprising at least one data symbol consisting of a plurality of subcarriers having data therein, and at least one pilot symbol including a plurality of subcarriers, at least one

of the subcarriers having a frequency component predetermined in amplitude and phase, and being inserted before or after one or more data symbols, said OFDM signal receiver comprising:

a Fourier transformer for subjecting the received OFDM signal to Fourier transform;

a transmission path frequency response compensator for detecting the pilot symbol from a signal provided by said Fourier transformer, and, with respect to the signal, compensating for a frequency response variation of a transmission path; and

a demodulator for receiving the signal compensated for the frequency response variation of the transmission path, and demodulating the signal to output demodulated data,

wherein said transmission path frequency response compensator comprises:

a pilot symbol detector for detecting both a first pilot symbol being an arbitrary pilot symbol and a second pilot symbol transmitted after the first pilot symbol;

a first pilot symbol transmission path frequency response calculator for calculating a first pilot symbol transmission path frequency response by dividing a frequency response of the first pilot symbol by that of a reference pilot symbol provided on a reception side;

a second pilot symbol transmission path frequency response calculator for calculating a second pilot symbol transmission path frequency response by dividing a frequency response of the second pilot symbol by that of the reference pilot symbol;

a compensation vector calculator for calculating, after inputting the first and second pilot symbol transmission path frequency responses thereto, a compensation vector for compensating for the frequency response variation of the transmission path; and

a frequency response compensator for compensating for the frequency response of one or more data symbols after inputting the compensation vector.

Claim 19 **(Currently Amended)** An OFDM signal receiver for receiving, from a transmission side, an OFDM signal comprising at least one data symbol having only a plurality of subcarriers having data therein, and at least one pilot symbol including a plurality of subcarriers, at least one of the subcarriers having a frequency component predetermined in amplitude and phase, and being inserted before or after one or more data symbols, said OFDM signal receiver comprising:

a Fourier transformer for subjecting the received OFDM signal to Fourier transform;

a phase compensator for detecting the pilot symbol from a signal provided by said Fourier transformer, and compensating the signal for at least one of frequency drift and residual phase error; and

a demodulator for receiving the signal compensated for the at least one of the frequency drift and the residual phase error, and demodulating the signal to output demodulated data, wherein

said phase compensator compensates for a frequency response variation of a transmission path resulting from at least one of the frequency drift and the residual phase error by using a value calculated, as a time series linear approximation, from a difference in phase between any two pilot symbols closest to each other.

Claim 20 **(Previously Presented)** An OFDM signal receiver for receiving, from a transmission side, an OFDM signal comprising at least one data symbol consisting of a plurality of subcarriers having data therein, and at least one pilot symbol including a plurality of subcarriers, at least one of the subcarriers having a frequency component predetermined in amplitude and phase, and being inserted before or after one or more data symbols, said OFDM signal receiver comprising:

a Fourier transformer for subjecting the received OFDM signal to Fourier transform;

a phase compensator for detecting the pilot symbol from a signal provided by said Fourier transformer, and compensating the signal for at least one of frequency drift and residual phase error; and

a demodulator for receiving the signal compensated for the at least one of the frequency drift and the residual phase error, and demodulating the signal to output demodulated data,

wherein said phase compensator calculates a compensation value for compensation, by referring to a first difference between a phase of a pilot symbol and a predetermined phase, and a second difference in phase between any two pilot symbols closest to each other, so that a phase of the received data symbol corresponds to the predetermined phase.

Claim 21 **(Previously Presented)** The OFDM signal receiver according to claim 20, wherein said phase compensator calculates the first and second differences by using a phase average value calculated for every pilot carrier included in each of the pilot symbols.

Claim 22 **(Previously Presented)** The OFDM signal receiver according to claim 21, wherein the phase average value is calculated by weighing each amplitude value for the pilot carriers.

Claim 23 **(Previously Presented)** The OFDM signal receiver according to claim 20, wherein said phase compensator calculates the phase compensation value as a time series linear approximation from a difference in phase between any two pilot symbols closest to each other.

Claim 24 **(Previously Presented)** An OFDM signal receiver for receiving, from a transmission side, an OFDM signal comprising at least one data symbol consisting of a plurality of subcarriers having data therein, and at least one pilot symbol including a plurality of subcarriers, at least one of the subcarriers having a frequency component predetermined in amplitude and phase, and being inserted before or after one or more data symbols, said OFDM signal receiver comprising:

a Fourier transformer for subjecting the received OFDM signal to Fourier transform;

a phase compensator for detecting the pilot symbol from a signal provided by said Fourier transformer, and compensating the signal for at least one of frequency drift and residual phase error; and

a demodulator for receiving the signal compensated for the at least one of the frequency drift and the residual phase error, and demodulating the signal to output demodulated data,

wherein said phase compensator comprises:

a pilot symbol detector for detecting both a first pilot symbol being an arbitrary pilot symbol and a second pilot symbol transmitted after the first pilot symbol;

a first pilot symbol phase difference calculator for calculating a difference between a phase of the first pilot symbol and a predetermined phase;

a pilot symbol phase difference calculator for calculating a difference in phase between the first pilot symbol and the second pilot symbol;

a phase compensation value calculator for calculating, after inputting the phase difference value calculated by said first pilot symbol phase difference calculator and the phase difference calculated by said pilot symbol phase difference calculator thereto, a phase compensation value for compensating for the at least one of the frequency drift and the residual phase error; and

a phase rotator for rotating, in response to the phase compensation value, a phase of the data symbol.

Claim 25 **(Previously Presented)** The OFDM signal transmitter according to claim 12, wherein said data symbol generator comprises:

a frequency-domain data symbol generator for generating a frequency-domain data symbol after inputting the data for transmission; and

a time-domain data symbol converter for converting the frequency-domain data symbol into a time-domain data symbol, and

said pilot symbol generator comprises:

a frequency-domain pilot symbol generator for generating a frequency-domain pilot symbol; and

a time-domain pilot symbol converter for converting the frequency-domain pilot symbol into a time-domain pilot symbol.

Claim 26 **(Currently Amended)** An OFDM signal receiver for receiving, from a transmission side, an OFDM signal comprising at least one data symbol having only a plurality of subcarriers having data therein, and at least one pilot symbol including a plurality of subcarriers, at least one of the subcarriers having a frequency component predetermined in amplitude and phase, and being inserted before or after one or more data symbols, said OFDM signal receiver comprising:

a frequency-domain data symbol generator for generating a frequency-domain data symbol from the received OFDM signal;

a transmission path frequency response compensator for detecting the pilot symbol from a signal provided by said frequency-domain data symbol generator, and with respect to the signal, compensating for a frequency response variation of a transmission path; and

a demodulator for receiving the signal compensated for the frequency response variation of the transmission path, and demodulating the signal to output demodulated data, wherein

said transmission path frequency response compensator compensates for the frequency response variation of the transmission path by using a compensation vector calculated, as a time series linear approximation, from a difference in frequency response between any two pilot symbols closest to each other.

Claim 27 **(Currently Amended)** The OFDM signal receiver according to claim 26, wherein said transmission path frequency response compensator calculates the ~~a~~ compensation vector for compensation by referring to a frequency response of a pilot symbol, a frequency response of another pilot symbol closet thereto, and a frequency response of a reference pilot symbol provided on a reception side, so that a frequency response of the received data symbol corresponds to that of the reference pilot symbol.

Claim 28 **(Currently Amended)** An OFDM signal receiver for receiving, from a transmission side, an OFDM signal comprising at least one data symbol having only a plurality of subcarriers having data therein, and at least one pilot symbol including a plurality of subcarriers, at least one of the subcarriers having a frequency component predetermined in amplitude, and being inserted before or after one or more data symbols, said OFDM signal receiver comprising:

a frequency-domain data symbol generator for generating a frequency-domain data symbol from the received OFDM signal;

a phase compensator for detecting the pilot symbol from a signal provided by said frequency-domain data symbol generator, and compensating the signal for at least one of frequency drift and residual phase error; and

a demodulator for receiving the signal compensated for the at least one of the frequency drift and the residual phase error, and demodulating the signal to output demodulated data, wherein

said phase compensator compensates for a frequency response variation of a transmission path resulting from at least one of the frequency drift and the residual phase error by using a value calculated, as a time series linear approximation, from a difference in phase between any two pilot symbols closest to each other.

Claim 29 **(Currently Amended)** An OFDM signal format comprising:

at least one data symbol having only a plurality of subcarriers having data therein, and

at least one pilot symbol having a plurality of subcarriers, at least one of the subcarriers having a frequency component predetermined in amplitude and phase,

~~———~~wherein

one or more the pilot symbols are located before or after one or more data symbols on a time axis,

on a reception side, the pilot symbol is received and utilized for compensating for a frequency response variation of a transmission path resulted from at least one of distortion in the transmission path, out-of-synchronization with passage of time, frequency drift, and residual phase error, and

the frequency response variation of the transmission path is compensated for by using a compensation vector calculated, as a time series linear approximation, from a difference in frequency response between any two pilot symbols closest to each other.

Claim 30 **(Currently Amended)** An OFDM signal transmitting apparatus comprising:

an OFDM signal generator for generating an OFDM signal for transmission; and

a transmitter for transmitting the OFDM signal,

wherein

the OFDM signal comprises

at least one data symbol having only a plurality of subcarriers having data therein, and

at least one pilot symbol having a plurality of subcarriers having a frequency component predetermined in amplitude and phase, ~~and~~

~~wherein~~ one or more pilot symbols are located before or after one or more data symbols in a time-domain,

on a reception side, the pilot symbol is received and utilized for compensating for a frequency response variation of a transmission path resulted from at least one of distortion in the transmission path, out-of-synchronization with passage of time, frequency drift, and residual phase error, and

the frequency response variation of the transmission path is compensated for by using a compensation vector calculated, as a time series linear approximation, from a difference in frequency response between any two pilot symbols closest to each other.

Claim 31 **(Currently Amended)** A method for transmitting an OFDM signal, the method comprising:

generating the OFDM signal; and

transmitting the OFDM signal,

———wherein

_____the OFDM signal comprises

at least one data symbol having only a plurality of subcarriers having data therein, and

at least one pilot symbol having a plurality of subcarriers having a frequency component predetermined in amplitude and phase,~~ and~~

~~wherein~~ one or more pilot symbols are located before or after one or more data symbols in a time-domain,

on a reception side, the pilot symbol is received and utilized for compensating for a frequency response variation of a transmission path resulted from at least one of distortion in the transmission path, out-of-synchronization with passage of time, frequency drift, and residual phase error, and

the frequency response variation of the transmission path is compensated for by using a compensation vector calculated, as a time series linear approximation, from a difference in frequency response between any two pilot symbols closest to each other.

Claim 32 **(Currently Amended)** An OFDM signal receiving apparatus comprising:

a receiver for receiving an OFDM signal; and

a converter for converting a time domain symbol of the OFDM signal into a frequency domain symbol,

———wherein

_____the OFDM signal comprises

at least one data symbol having only a plurality of subcarriers having data therein, and

at least one pilot symbol having a plurality of subcarriers having a frequency component predetermined in amplitude and phase,~~ and~~

~~wherein~~ one or more pilot symbols are located before or after one or more data symbols in a time-domain,

the received pilot symbol is utilized for compensating for a frequency response variation of a transmission path resulted from at least one of distortion in the transmission path, out-of-synchronization with passage of time, frequency drift, and residual phase error, and

the frequency response variation of the transmission path is compensated for by using a compensation vector calculated, as a time series linear approximation, from a difference in frequency response between any two pilot symbols closest to each other.

Claim 33 **(Currently Amended)** A method for receiving an OFDM signal, the method comprising:

receiving the OFDM signal; and

converting a time domain symbol of the OFDM signal into a frequency domain symbol,

wherein

the OFDM signal comprises

at least one data symbol having only a plurality of subcarriers having data therein, and

at least one pilot symbol having a plurality of subcarriers having a frequency component predetermined in amplitude and phase, ~~and~~

~~wherein~~ one or more pilot symbols are located before or after one or more data symbols in a time-domain,

the received pilot symbol is utilized for compensating for a frequency response variation of a transmission path resulted from at least one of distortion in the transmission path, out-of-synchronization with passage of time, frequency drift, and residual phase error, and

the frequency response variation of the transmission path is compensated for by using a compensation vector calculated, as a time series linear approximation, from a difference in frequency response between any two pilot symbols closest to each other.

Claim 34 **(New)** A method for transmitting an OFDM signal from a transmission side to a reception side, wherein

the OFDM signal comprises at least one data symbol having only a plurality of subcarriers having data therein, and at least one pilot symbol including a plurality of subcarriers, at least one of the subcarriers having a frequency component predetermined in amplitude and phase, said method comprising:

inserting, on the transmission side, the pilot symbol before or after one or more data symbols, and transmitting the pilot symbol together with one or more data symbols; and

utilizing, on the reception side, the received pilot symbol for compensating for a frequency response variation of a transmission path resulted from at least one of distortion in the transmission path, out-of-synchronization with passage of time, frequency drift, and residual phase error, wherein

the frequency response variation of the transmission path resulting from at least one of the frequency drift and the residual phase error is compensated for by using a value calculated, as a time series linear approximation, from a difference in phase between any two pilot symbols closest to each other.

Claim 35 **(New)** An OFDM signal format comprising:

at least one data symbol having only a plurality of subcarriers having data therein, and

at least one pilot symbol having a plurality of subcarriers, at least one of the subcarriers having a frequency component predetermined in amplitude and phase, wherein

one or more the pilot symbols are located before or after one or more data symbols on a time axis,

on a reception side, the pilot symbol is received and utilized for compensating for a frequency response variation of a transmission path resulted from at least one of distortion in the transmission path, out-of-synchronization with passage of time, frequency drift, and residual phase error, and

the frequency response variation of the transmission path resulting from at least one of the frequency drift and the residual phase error is compensated for by using a value calculated, as a time series linear approximation, from a difference in phase between any two pilot symbols closest to each other.